

CLAIMS

What is claimed is:

1. A color sensor comprising:

a color sensor circuit produces photocurrent from a color component of a light input, wherein said color sensor circuit outputs a first voltage indicating intensity of said color component;

a dark color sensor circuit for producing dark photocurrent and outputting a second voltage indicating an offset voltage; and

a differential amplifier circuit coupled to said color sensor circuit and to said dark color sensor circuit, for receiving said first and second voltages and outputting a final output canceling contributions of said offset voltage in said first voltage due to said dark photocurrent.

2. The color sensor circuit of Claim 1, wherein said color sensor circuit comprises:

a transimpedance amplifier including an output for outputting said first voltage, a negative input, and a positive input;

a feedback resistor with one end coupled to said output and another end coupled to said negative input;

a compensation capacitor coupled in parallel with said feedback resistor to said output and said negative input; and

a photodetector for detecting said photocurrent of said color component including a photodetector input coupled to ground and to said positive input, and a photodetector output coupled to said negative input.

3. The color sensor circuit of Claim 1, wherein said dark color sensor circuit comprises:

- a transimpedance amplifier including an output for outputting said second voltage, a negative input, and a positive input;

- a feedback resistor with one end coupled to said output and another end coupled to said negative input;

- a compensation capacitor coupled in parallel with said feedback resistor to said output and said negative input; and

- a photodetector for detecting said dark photocurrent including a photodetector input coupled to ground and to said positive input, and a photodetector output coupled to said negative input.

4. The color sensor circuit of Claim 1, wherein said differential amplifier circuit comprises:

- a difference amplifier comprising an output for outputting said final output; a positive input, and a negative input;

- a feedback resistor having a resistor value with one end coupled to said negative input and another end coupled to said output;

- a first resistor having said resistor value coupled in series with an color sensor output outputting said first voltage and said negative input;

- a second resistor having said resistor value coupled in series with a dark sensor output of said dark sensor circuit outputting said second voltage and said positive voltage; and

- a third resistor having said resistor value coupled in series to said positive input and to ground.

5. The color sensor circuit of Claim 4, wherein said resistor value approximates resistance of a feedback resistor in said color sensor circuit.

6. The color sensor circuit of Claim 1, wherein said color component comprises red.

7. The color sensor circuit of Claim 1, wherein said color component comprises green.

8. The color sensor circuit of Claim 1, wherein said color component comprises blue.

9. A color sensor comprising:

a plurality of color sensor circuits, each producing photocurrent from a respective color component of light input, and each outputting an associated voltage indicating intensity of said respective color component;

a dark color sensor circuit for producing dark photocurrent and outputting an offset voltage;

at least one differential amplifier circuit coupled to said plurality of color sensor circuits and to said dark color sensor circuit for receiving said associated voltage and said offset voltage and outputting a final output canceling contributions of said offset voltage due to said dark photocurrent in said voltage of said respective color component.

10. The color sensor of Claim 9, further comprising:

a plurality of differential amplifier circuits, including said at least one differential amplifier circuit, wherein each of said plurality of differential amplifier circuits corresponds to an associated color sensor circuit in said plurality of color sensor circuits, and is coupled to said associated color sensor circuit and to said dark color sensor circuit, and wherein each of said plurality of differential amplifier circuits comprises:

a difference amplifier comprising an output for outputting said final output; a positive input, and a negative input;

a feedback resistor having a resistor value with one end coupled to said negative input and another end coupled to said positive input, wherein said resistor value approximates resistance of a feedback resistor in said associated color sensor circuit;

a first resistor having said resistor value coupled in series with said negative input and a color sensor output outputting said associated voltage of said associated color sensor circuit;

a second resistor having said resistor value coupled in series said positive voltage and with a dark sensor output of said dark color sensor circuit outputting said offset voltage; and

a third resistor coupled in series to said positive input and to ground.

11. The color sensor of Claim 9, wherein each of said plurality of color sensor circuits comprises:

a transimpedance amplifier including an output for outputting said associated voltage, a negative input, and a positive input;

a feedback resistor with one end coupled to said output and another end coupled to said negative input;

a compensation capacitor coupled in parallel with said feedback resistor to said output and said negative input; and

a photodetector for detecting said photocurrent of said color component including a photodetector input coupled to ground and to said positive input, and a photodetector output coupled to said negative input.

12. The color sensor circuit of Claim 9, wherein said dark color sensor circuit comprises:

a transimpedance amplifier including an output for outputting said offset voltage, a negative input, and a positive input;

a feedback resistor with one end coupled to said output and another end coupled to said negative input;

a compensation capacitor coupled in parallel with said feedback resistor to said output and said negative input; and

a photodetector for detecting said dark photocurrent including a photodetector input coupled to ground and to said positive input, and a photodetector output coupled to said negative input.

13. The color sensor circuit of Claim 9, wherein said color component comprises red.

14. The color sensor circuit of Claim 9, wherein said color component comprises green.

15. The color sensor circuit of Claim 9, wherein said color component comprises blue.

16. A method for sensing color, comprising:
measuring a first voltage associated with intensity of a color component of a light input;

measuring an offset voltage associated with dark current offset affecting said measurement of said first voltage; and

subtracting said offset voltage from said first voltage to cancel said dark current offset in said first voltage in order to obtain a final output voltage representing said intensity compensating for said dark current offset.

17. The method of Claim 16, further comprising:

matching a resistor value for resistors in a differential amplifier circuit, to a resistance of a feedback resistor in a color sensor circuit used to measure said first voltage, wherein said differential circuit receives said first voltage and said offset voltage and outputs said final voltage.

18. The method of claim 16, further comprising:

measuring a plurality of voltages associated with intensities of respective color components of said light input; and

subtracting said offset voltage from each of said plurality of voltages to cancel said dark current offset in order to obtain a plurality of final output voltages representing intensity of said respective color components that each compensate for said dark current offset.

19. The color sensor circuit of Claim 16, wherein said color component comprises red.

20. The color sensor circuit of Claim 16, wherein said color component comprises green.

21. The color sensor circuit of Claim 16, wherein said color component comprises blue.